BEAM DEFLECTION AT N^TH POINTS (63120)

__S. H. No.____ Project _____ 14

Project No._____ Control Sect. No._____ By_____ Chk._____ Date 3/8/77

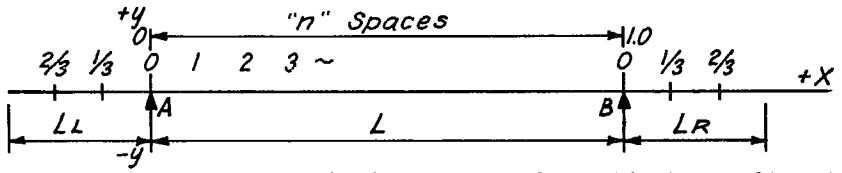
L in Feet — I in Ft^4 (1) or In^4 (2) — Rdwy. slab

M in Kip Feet — E in psi — Ext. cell (Member 2)

W in Kips per foot — Sign of M + if tension in bottom

If load is single concentrated or uniform do not list M at N^TH points.

IDENT. 1 4	BM. NO. 5 6
2222	01



LIST 1 FOR BM. CONSTANTS & F.E.M.

(KIP)

7 8 9 10	11 14	15 16	17 20	21 22	23 26	27 28	29 32	33 34	35 38	39 40
1 NO. SPA. 10	I 2	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.

41 44	45 46	47 50	51 52	53 56	57 58	59 62	63 64	65 68	69 70	71
20*0 CONC. LOAD.	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	1

7 8 14	15 21	22 28	29 35	36 42
2 L 1483	Mo 5262	M1.0 2026	Io 11493	I1.0 6725

NOTE: List M & I for (n-1) Points

43 49	50 57	58
W 0	E 4,500,000	0 1 2

Number of Cantilevers

POINT 7 8	9 M 15	16 I 22
0.1	4639	9030
0.2	3930	6946
0.3	3133	5210
0.4	2249	3791
0.5	1268	2656
0.6	206	1774
0.7	-679	1113
0.8	-802	993
0.9	612	3002
1.0		
1.1		
1.2		
1.3		
1.4		
1.5		

7 8	9 M 15	16 I 22
1.6		
1.7		
1.8		
1.9		
2.0		
2.1		
2.2		
2.3		
2.4		
2.5		
2.6		
2.7		
2.8		
2.9		
3.0		

CANTILEVER CARDS

7 8	LL 14	15 M 2/3 21	22 M 1/3 28	29 Mo 35	36 I 2/3 42
3					

Cantilever on Left →

43 I 1/3 49	50 Io 56

	LR				
4					

Cantilever on Right →

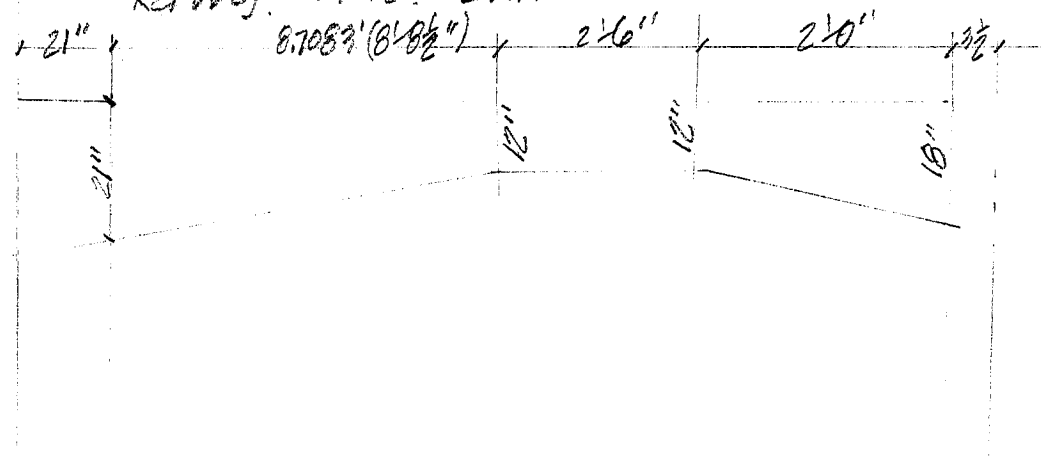
HF 33.41

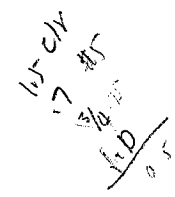
33003169

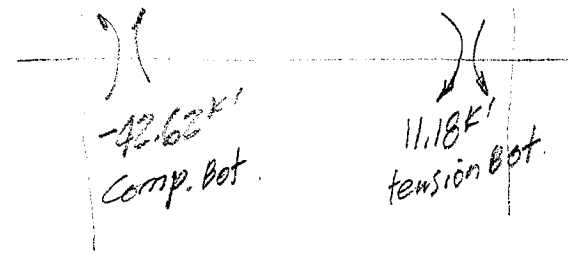
```
10 2222 0.   10 2 20*0 1
20 2 14.83  2.62 20.26 11493 6725 0 4500000 0
30 1 47.39 9030
40 2 39.30 6946
50 3 31.33 5210
60 4 22.49 3791
70 5 12.68 2656
80 6 2.06 1774
90 7 -1.59 1728
100 8 -1.59 1728
110 9 6.12 3002
END OF DATA
 2222  BEAM NO.   1

        14.83 FT. SPAN   W=    0.0     E=  4500000.

   SLOPE LEFT=-.00104197 SLOPE RIGHT=0.00051692

 DEFLECTION AT NTH POINTS IN INCHES

                        M=       52.62. I=    11493.00

     1/10,DEFLECTION=  -0.01651  M=       47.39, I=     9030.00

     2/10,DEFLECTION=  -0.02860  M=       39.30, I=     6946.00

     3/10,DEFLECTION=  -0.03592  M=       31.33, I=     5210.00

     4/10,DEFLECTION=  -0.03819  M=       22.49, I=     3791.00

     5/10,DEFLECTION=  -0.03552  M=       12.68, I=     2656.00

     6/10,DEFLECTION=  -0.02900  M=        2.06, I=     1774.00

     7/10,DEFLECTION=  -0.02139  M=       -1.59, I=     1728.00

     8/10,DEFLECTION=  -0.01441  M=       -1.59, I=     1728.00

     9/10,DEFLECTION=  -0.00799  M=        6.12, I=     3002.00

                        M=       20.26, I=     6725.00

 STIFFNESS FACTORS   KAB= 14.4638    KBA=  7.1922

 CARRY-OVER FACTORS  CAB= 0.4504    CBA= 0.9058

 FIXED END MOM. LEFT=    -42.62 K-FT.
FIXED END MOM. RIGHT=     11.18 K-FT.
```

33003170

Rdwy. Slab. Ext. cell







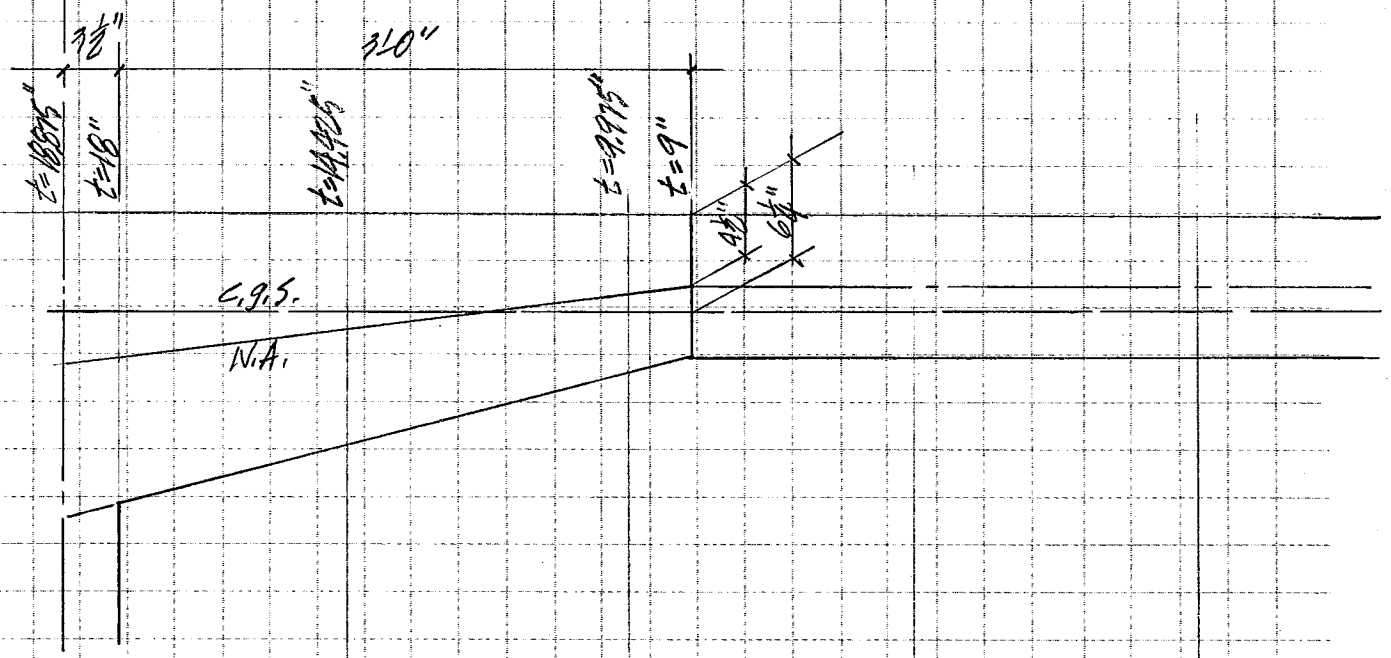
15

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project ..... Sheet No. 16 of ..... sheets

S. R. ..... Made by ..... Check by ..... Date 3/82 Supv. YFC/RTS

Section properties – Rdwy slab – Int. cell



	$0L_3$ (1.0L_3)	$.1L_3$ (.9L_3)	$.2L_3$ (.8L_3)	$.3L_3$ → $.7L_3$
t"	18.875	14.425	9.975	9"
I in⁴	6725	3002	993	729
e"	3.1875	.9625	−1.2625	−1.75
Pe k'	20.26	6.12	−8.02	−11.12

33003171

DOT Form 232-007 Revised 10/82

Sheet No.

BEAM DEFLECTION AT N^TH POINTS (63120)

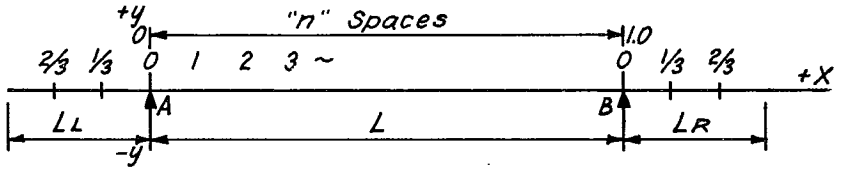
17

__S. H. No.____ Project _____

Project No._____ Control Sect. No._____ By_____ Chk._____ Date_____

Ordinary Moment
Rdwy Slab - Int. cell
(Member 3)

L in Feet — I in Ft^4 (1) or In^4 (2)
M in Kip Feet — E in psi
W in Kips per foot — Sign of M + if tension in bottom
If load is single concentrated or uniform do not list M at N^TH points.



IDENT. 1 4	BM. NO. 5 6
3450	01

(KIP)

LIST 1 FOR BM. CONSTANTS & F.E.M.

7	8 9	10	11 14	15 16	17 20	21 22	23 26	27 28	29 32	33 34	35 38	39 40
1	NO. SPA.	I	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.
	10	2										

20*0

41 44	45 46	47 50	51 52	53 56	57 58	59 62	63 64	65 68	69 70	71
CONC. LOAD.	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	
										1

7	8 14	15 21	22 28	29 35	36 42
2	L	Mo	M1.0	Io	I1.0
	1483	2026	2026	6725	6725

NOTE:
List M & I
for (n-1) Points

43 49	50 57	58
W	E	0 1 2
0	4500000	

Number of Cantilevers

POINT 7 8	9 M 15	16 I 22
01	612	3002
02	-802	993
03	-1112	729
04	-1112	729
05	-1112	729
06	-1112	729
07	-1112	729
08	-802	993
09	612	3002
10		
11		
12		
13		
14		
15		

7 8	9 M 15	16 I 22
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

CANTILEVER CARDS

7	8 LL 14	15 M 2/3 21	22 M 1/3 28	29 Mo 35	36 I 2/3 42
3					

Cantilever on Left →

43 I 1/3 49	50 Io 56

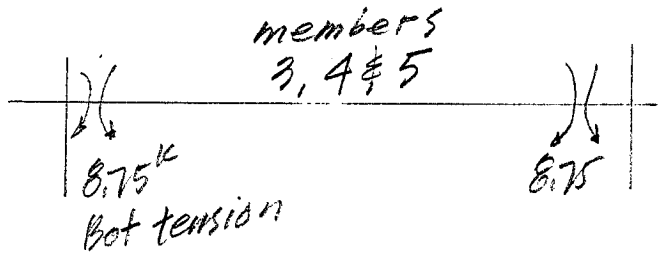
4	LR				

Cantilever on Right →

HF 33.41

33003172

```
10 3450 1 1 10 2 20*0 1
20 2 14.8[illegible] [illegible].26 20.26 6725 6725 0 4500000 0
30 1 6.12 [illegible]2
40 2 -8.02 993
50 3 -11.12 729
60 4 -11.12 729
70 5 -11.12 729
80 6 -11.12 729
90 7 -11.12 729
100 8 -8.02 993
110 9 6.12 3002
END OF DATA
 14.83 FT. SPAN   W=    0.0     E=  4500000.

    SLOPE LEFT=0.00201053 SLOPE RIGHT=-.00201053

 DEFLECTION AT NTH POINTS IN INCHES

                        M=       20.26, I=     6725.00

     1/10,DEFLECTION=   0.03724  M=        6.12, I=     3002.00

     2/10,DEFLECTION=   0.07555  M=       -8.02, I=      993.00

     3/10,DEFLECTION=   0.10725  M=      -11.12, I=      729.00

     4/10,DEFLECTION=   0.12657  M=      -11.12, I=      729.00

     5/10,DEFLECTION=   0.13302  M=      -11.12, I=      729.00

     6/10,DEFLECTION=   0.12657  M=      -11.12, I=      729.00

     7/10,DEFLECTION=   0.10725  M=      -11.12, I=      729.00

     8/10,DEFLECTION=   0.07555  M=       -8.02, I=      993.00

     9/10,DEFLECTION=   0.03724  M=        6.12, I=     3002.00

                        M=       20.26, I=     6725.00

 STIFFNESS FACTORS   KAB=  8.8754    KBA=  8.8754

 CARRY-OVER FACTORS  CAB= 0.6809    CBA= 0.6809

 FIXED END MOM. LEFT=      8.75 K-FT.
FIXED END MOM. RIGHT=      8.75 K-FT.

 PROCESSING COMPLETED.
```



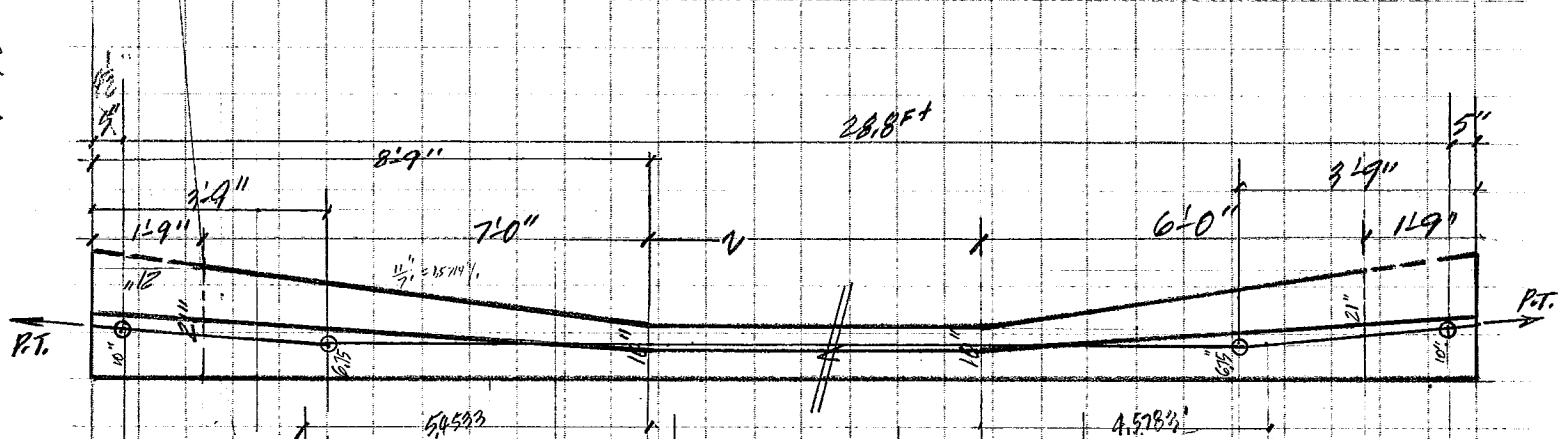
33003173

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project ..... Sheet No. 19 of ..... sheets

S. R. ..... Made by ..... Check by ..... Date 3/82 Supv. YFC/RTS

VERTICAL WALL (ext. vert. wall) member 8



	0	.1	.2	.3	.7	.8	.9	1.0
t"	23.095	18.570	14.044	10	10	13.114	18.394	23.674
I ‴	1239	6403	2770	1000	1000	2255	6223	13268
e"	-1.548	-2.034	-.272	1.75	1.75	-.3068	-1.903	-1.837
Pe"	-8.98	-11.80	-1.58	10.15	10.15	-1.78	-11.04	-10.654

P = 69.6 K/ft of $1\frac{3}{8}$" ϕ P.T. Bar @ 1'-11" ctrs

AWB: use 1'-9" spa to match top slab strands.

$$P = \frac{69.6^{K}/_{ft}\,(1'\text{-}11'')}{(1'\text{-}9'')} = 76.23^{K}/_{ft}$$

$$\left(\text{or } P = 133.4^{K}/_{ft}\left(\frac{12''}{21}\right) = 76.23^{K}/_{ft}\right)$$

33003174

BEAM DEFLECTION AT N^{TH} POINTS (63120)

S. H. No. _____ Project _____ 20

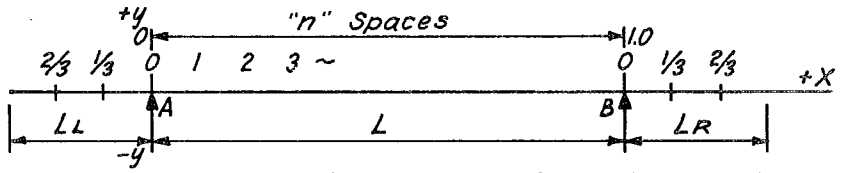
Project No. _____ Control Sect. No. _____ By _____ Chk. _____ Date _____

L in Feet — I in Ft^4 (1) or In^4 (2) — VERT. WALL, EXT. (2)

M in Kip Feet — E in psi

W in Kips per foot — Sign of M + if tension in bottom

If load is single concentrated or uniform do not list M at N^{TH} points.



IDENT. (1–4)	BM. NO. (5–6)
8000	01

LIST 1 FOR BM. CONSTANTS & F.E.M.

(KIP)

1	NO. SPA. (7–8)	I (9–10)	CONC. LOAD (11–14)	AT PT. (15–16)	CONC. LOAD (17–20)	AT PT. (21–22)	CONC. LOAD (23–26)	AT PT. (27–28)	CONC. LOAD (29–32)	AT PT. (33–34)	CONC. LOAD (35–38)	AT PT. (39–40)
	10	2										

20 KO

CONC. LOAD. (41–44)	AT PT. (45–46)	CONC. LOAD (47–50)	AT PT. (51–52)	CONC. LOAD (53–56)	AT PT. (57–58)	CONC. LOAD (59–62)	AT PT. (63–64)	CONC. LOAD (65–68)	AT PT. (69–70)	(71)
										1

2	L (7–14)	M_0 (15–21)	$M_{1.0}$ (22–28)	I_0 (29–35)	$I_{1.0}$ (36–42)
	20.83	-8.98	-10.65	123.19	132.68

W (43–49)	E (50–57)	(58)
0	4,500,000	0

58: 0, 1, 2 — Number of Cantilevers

NOTE: List M & I for (n-1) Points

POINT (7–8)	M (9–15)	I (16–22)
0.1	-1.18	6403
0.2	-1.58	2770
0.3	1.015	1000
0.4		
0.5		
0.6		
0.7	1.015	1000
0.8	-1.78	2256
0.9	-1.104	6223
1.0		
1.1		
1.2		
1.3		
1.4		
1.5		

POINT (7–8)	M (9–15)	I (16–22)
1.6		
1.7		
1.8		
1.9		
2.0		
2.1		
2.2		
2.3		
2.4		
2.5		
2.6		
2.7		
2.8		
2.9		
3.0		

CANTILEVER CARDS

3	LL (7–14)	$M_{2/3}$ (15–21)	$M_{1/3}$ (22–28)	M_0 (29–35)	$I_{2/3}$ (36–42)

Cantilever on Left →

$I_{1/3}$ (43–49)	I_0 (50–56)

4	LR (7–14)				

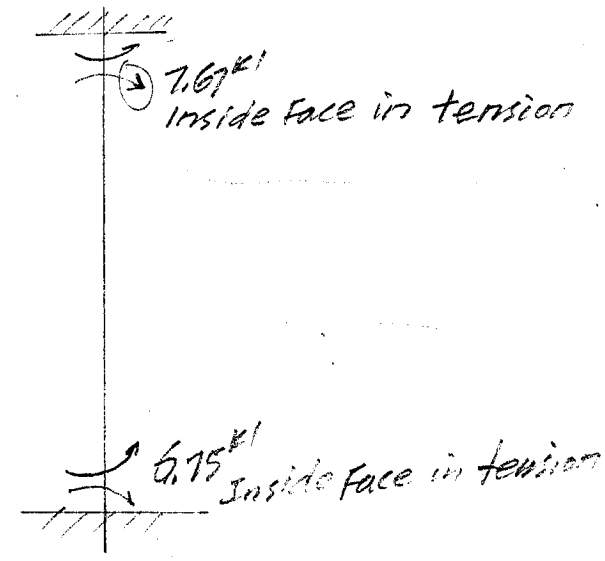
Cantilever on Right →

33003175

HF 33-41

```
30 1 -11.8 6403
40 2 -1.58 2770
50 3 10.1[illegible] [illegible]00
60 4 10.1[illegible] [illegible]00
70 5 10.15 1000
80 6 10.15 1000
90 7 10.15 1000
100 8 -1.78 2255
110 9 -11.04 6223
END OF DATA
.  8000  BEAM NO.   1

        28.83 FT. SPAN   W=    0.0     E=  4500000.

   SLOPE LEFT=-.00206353 SLOPE RIGHT=0.00205595

 DEFLECTION AT NTH POINTS IN INCHES

                        M=       -8.98, I=    12319.00

     1/10,DEFLECTION=  -0.07346  M=      -11.80, I=     6403.00

     2/10,DEFLECTION=  -0.15217  M=       -1.58, I=     2770.00

     3/10,DEFLECTION=  -0.23019  M=       10.15, I=     1000.00

     4/10,DEFLECTION=  -0.27867  M=       10.15, I=     1000.00

     5/10,DEFLECTION=  -0.29474  M=       10.15, I=     1000.00

     6/10,DEFLECTION=  -0.27843  M=       10.15, I=     1000.00

     7/10,DEFLECTION=  -0.22971  M=       10.15, I=     1000.00

     8/10,DEFLECTION=  -0.15151  M=       -1.78, I=     2255.00

     9/10,DEFLECTION=  -0.07319  M=      -11.04, I=     6223.00

                        M=      -10.65, I=    13268.00


 STIFFNESS FACTORS   KAB= 12.1439    KBA= 11.8077

 CARRY-OVER FACTORS  CAB= 0.7204    CBA= 0.7409

 FIXED END MOM. LEFT=     -7.67 K-FT.
FIXED END MOM. RIGHT=     -6.75 K-FT.

 PROCESSING COMPLETED.

READY
```

33003176



BEAM DEFLECTION AT N^TH POINTS (63120)

22

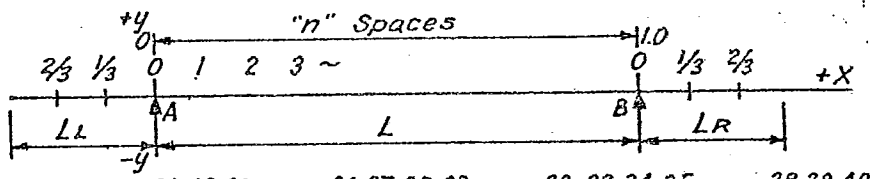
S. H. No. ____ Project ____

Project No. ____ Control Sect. No. ____ By ____ Chk. ____ Date ____

2ndary Moment
Bot. Ext. cell.
Slab

L in Feet — I in Ft^4(1) or In^4(2)
M in Kip Feet — E in psi
W in Kips per foot — Sign of M + if tension in bottom
If load is single concentrated or uniform do not list M at N^TH points.

IDENT. 1 4	BM. NO. 5 6
8888	01



LIST 1 FOR BM. CONSTANTS & F.E.M.

(KIP)

7	8 9	10	11 14	15 16	17 20	21 22	23 26	27 28	29 32	33 34	35 38	39 40
1	NO. SPA. 1.0	I 2	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.

20*0

41 44	45 46	47 50	51 52	53 56	57 58	59 62	63 64	65 68	69 70	71
CONC. LOAD.	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	1

7	8 14	15 21	22 28	29 35	36 42
2	L 1483	Mo -125	M1.0 -8	Io 15014	I1.0 3717

43 49	50 57	58
W 0	E 4500000	0 1 2

Number of Cantilevers

NOTE: List M & I for (n-1) Points

POINT 7 8	9 M 15	16 I 22
0.1	-105	8729
0.2	-85	4500
0.3	1	1920
0.4	67	1000
0.5	67	1000
0.6	67	1000
0.7	67	1000
0.8	53	1171
0.9	-14	2202
1.0		
1.1		
1.2		
1.3		
1.4		
1.5		

7 8	9 M 15	16 I 22
1.6		
1.7		
1.8		
1.9		
2.0		
2.1		
2.2		
2.3		
2.4		
2.5		
2.6		
2.7		
2.8		
2.9		
3.0		

CANTILEVER CARDS

7	8 LL 14	15 M 2/3 21	22 M 1/3 28	29 Mo 35	36 I 2/3 42
3					

Cantilever on Left →

43 I 1/3 49	50 Io 56

4	LR				

Cantilever on Right →

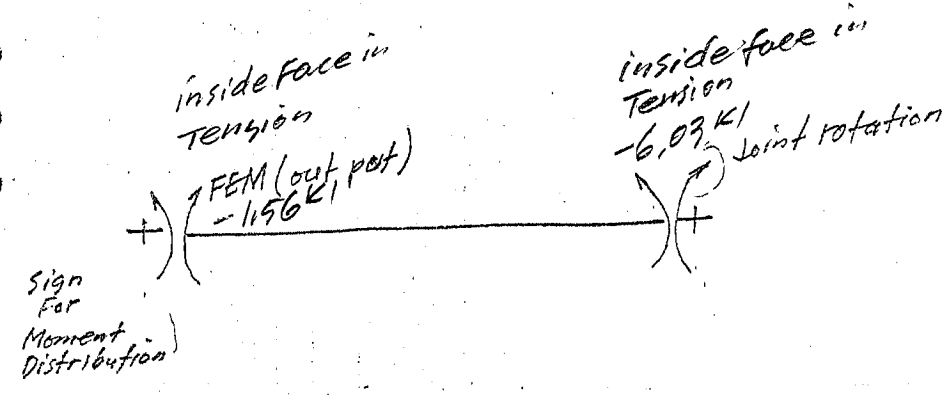
33003177

2ndary Momen

Bot. slab Ext. cell

```
10 8888 01 1 10 2 20*0 1
20 2 14.83 -12.5 -8 15014 3717 0 4500000 0
30 1 -10.5 8729
40 2 -8.5 4500
50 3 .1 1920
60 4 6.7 1000
70 5 6.7 1000
80 6 6.7 1000
90 7 6.7 1000
100 8 5.3 1171
110  9 -1.4 2202
END OF DATA
        14.83 FT. SPAN    W=     0.0      E=  4500000.

   SLOPE LEFT=-.00046979 SLOPE RIGHT=0.00076952

 DEFLECTION AT NTH POINTS IN INCHES

                        M=       -12.50, I=     15014.00

     1/10,DEFLECTION=  -0.00875  M=       -10.50, I=      8729.00

     2/10,DEFLECTION=  -0.01854  M=        -8.50, I=      4500.00

     3/10,DEFLECTION=  -0.02975  M=         0.10, I=      1920.00

     4/10,DEFLECTION=  -0.04057  M=         6.70, I=      1000.00

     5/10,DEFLECTION=  -0.04621  M=         6.70, I=      1000.00

     6/10,DEFLECTION=  -0.04618  M=         6.70, I=      1000.00

     7/10,DEFLECTION=  -0.04050  M=         6.70, I=      1000.00

     8/10,DEFLECTION=  -0.02932  M=         5.30, I=      1171.00

     9/10,DEFLECTION=  -0.01452  M=        -1.40, I=      2202.00

                        M=       -8.00, I=      3717.00

 STIFFNESS FACTORS   KAB= 13.6595    KBA=  8.2207

 CARRY-OVER FACTORS  CAB= 0.5402    CBA= 0.8976

 FIXED END MOM. LEFT=      -1.56 K-FT.
 FIXED END MOM. RIGHT=     -4.03 K-FT.
```

83031178



BEAM DEFLECTION AT N^TH POINTS (63120)

24

S.H. No.____ Project _____

Project No.____ Control Sect. No.____ By____ Chk.____ Date____

L in Feet — I in Ft^4 (1) or In^4 (2)

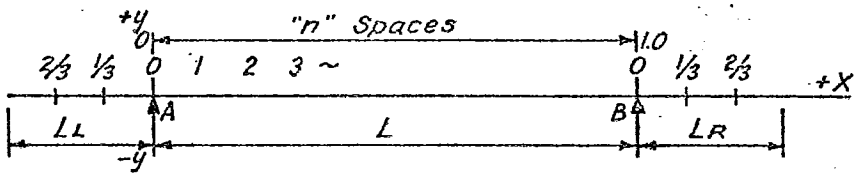
M in Kip Feet — E in psi

W in Kips per foot — Sign of M + if tension in bottom

If load is single concentrated or uniform do not list M at N^TH points.

2ndary Moment Bot. Int. cell. Slab

IDENT. (1–4)	BM. NO. (5–6)
3333	01



LIST 1 FOR BM. CONSTANTS & F.E.M.

(KIP)

1	NO. SPA.	I	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.
	10	2										

20*0

CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	
									1	1

2	L	Mo	M1.0	Io	I1.0
	1483	-8	-8	3717	3717

W	E	Number of Cantilevers
0	4,500,000	0 / 1 / 2

NOTE: List M & I for (n-1) Points

POINT	M	I
0.1	-14	2202
0.2	53	1171
0.3	67	1000
0.4	67	
0.5	67	
0.6	67	
0.7	67	1000
0.8	53	1171
0.9	-14	2202
1.0		
1.1		
1.2		
1.3		
1.4		
1.5		

	M	I
1.6		
1.7		
1.8		
1.9		
2.0		
2.1		
2.2		
2.3		
2.4		
2.5		
2.6		
2.7		
2.8		
2.9		
3.0		

CANTILEVER CARDS

3	LL	M 2/3	M 1/3	Mo	I 2/3

Cantilever on Left

I 1/3	Io

4	LR				

33003180

```
10 8888 01 1 10 2 20*0 1
20 2 14.8( ) -8 3717 3717 0 4500000 0
30 1 -1.4 )2
40 2 5.3 1171
50 3 6.7 1000
60 4 6.7 1000
70 5 6.7 1000
80 6 6.7 1000
90 7 6.7 1000
100 8 5.3 1171
110  9 -1.4 2202
END OF DATA
 8888  BEAM NO.   1

        14.83 FT. SPAN   W=    0.0     E=  4500000.

   SLOPE LEFT=-.00092722 SLOPE RIGHT=0.00092722

 DEFLECTION AT NTH POINTS IN INCHES

                        M=       -8.00, I=     3717.00

     1/10,DEFLECTION=  -0.01732  M=       -1.40, I=     2202.00

     2/10,DEFLECTION=  -0.03493  M=        5.30, I=     1171.00

     3/10,DEFLECTION=  -0.04892  M=        6.70, I=     1000.00

     4/10,DEFLECTION=  -0.05741  M=        6.70, I=     1000.00

     5/10,DEFLECTION=  -0.06024  M=        6.70, I=     1000.00

     6/10,DEFLECTION=  -0.05741  M=        6.70, I=     1000.00

     7/10,DEFLECTION=  -0.04892  M=        6.70, I=     1000.00

     8/10,DEFLECTION=  -0.03493  M=        5.30, I=     1171.00

     9/10,DEFLECTION=  -0.01732  M=       -1.40, I=     2202.00

                        M=       -8.00, I=     3717.00

 STIFFNESS FACTORS   KAB=  6.6817    KBA=  6.6817

 CARRY-OVER FACTORS  CAB= 0.6204    CBA= 0.6204

 FIXED END MOM. LEFT=     -4.96 K-FT.
FIXED END MOM. RIGHT=     -4.96 K-FT.
```

2ndary Moment

Bot. slab. Int. cell

inside Face in Tension

FEM (out put) -4.96 kl

-4.96 kl

Sign For Moment distribution.

33003181

BEAM DEFLECTION AT N^TH POINTS (63120)

S. H. No. ____ Project ____

Project No. ____ Control Sect. No. ____ By ____ Chk. ____ Date ____

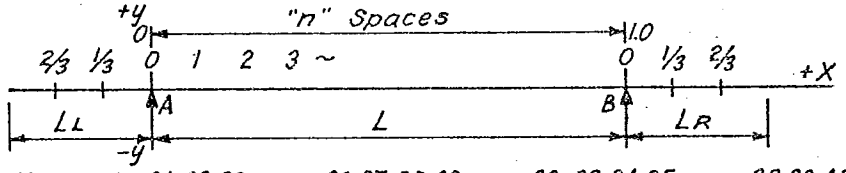
L in Feet — I in Ft^4 (1) or In^4 (2)

M in Kip Feet — E in psi

W in Kips per foot — Sign of M + if tension in bottom

If load is single concentrated or uniform do not list M at N^TH points.

2ndary Moment Bot. Int. cell. slab



IDENT. (1–4)	BM. NO. (5–6)
3333	01

(KIP)

1	NO. SPA.	I	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.
	10	2										

LIST 1 FOR BM. CONSTANTS & F.E.M.

20*0

CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	CONC. LOAD	AT PT.	1

2	L	M_0	$M_{1.0}$	I_0	$I_{1.0}$
	1483	-8	-8	3717	3717

W	E	Number of Cantilevers
0	4,500,000	0 / 1 / 2

NOTE: List M & I for (n-1) Points

POINT	M	I
0.1	-14	2202
0.2	53	1171
0.3	67	1000
0.4	67	
0.5	67	
0.6	67	
0.7	67	1000
0.8	53	1171
0.9	-14	2202
1.0		
1.1		
1.2		
1.3		
1.4		
1.5		

POINT	M	I
1.6		
1.7		
1.8		
1.9		
2.0		
2.1		
2.2		
2.3		
2.4		
2.5		
2.6		
2.7		
2.8		
2.9		
3.0		

CANTILEVER CARDS

3	L_L	$M_{2/3}$	$M_{1/3}$	M_0	$I_{2/3}$

Cantilever on Left →

$I_{1/3}$	I_0

4	L_R				